ABSTRACT OF THE DISCLOSURE

A method for in situ measurement of strain and temperature of metal and composite tubulars located in the marine environment using optical fiber techniques including Optical Time Domain Reflectrometry (OTDR) or Bragg Diffraction Gratings. The method provides the capability to make axial, circumferential and off-axis strain measurements on the body of the riser and in the metal to composite joint region. Through engineering analysis of optical strain measurements, the method provides the capability to determine the bending strain and frequency of Vortex Induced Vibrations (VIV) imposed by ocean currents. Optical fibers of either glass or polymeric composition are located on the outside of metal or composite risers following fabrication and bonded directly to the outer surface of the riser structural body and encapsulated in an outer protective cover. Strain measurements are transmitted to the surface either by a continuous optical fiber light path or by telemetry of a digitized signal.